

# Chapter 2

## Fifty Years of Change 1964–2014

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## Introduction

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Tobacco, a New World plant, was used by the native peoples of the Americas for millennia. Brought to the Old World by Christopher Columbus, tobacco and tobacco products soon spread worldwide. The manufactured cigarette has been the dominant form of tobacco use in the United States for only a century (Figure 2.1), surpassing other forms of use as the modern tobacco industry was shaped by James B. Duke and his American Tobacco Company (Chandler 1977). During that century, referred to as “The Cigarette Century” (Brandt 2007), there was a sharp rise in tobacco consumption to a peak in the 1960s and then a decline that has continued over the last three decades. This chapter addresses why this rise and fall of cigarette smoking occurred, giving emphasis to the half-century since the 1964 report of the Advisory Committee to the Surgeon General, *Smoking and Health*, and to the impact of the reports of the Surgeon General on tobacco use in the United States.

This chapter provides a perspective on the tobacco epidemic, setting a context for this anniversary report by describing some of the most critical “lessons learned” with regard to the factors driving tobacco use and the strategies for ending it. The following chapter describes the Surgeon General’s reports, including the approach used to compile and synthesize scientific evidence to reach conclusions that has been the foundation of these reports (see Chapter 3, “Producing the Surgeon General’s Report From 1964–2014: Process and Purpose”). Two major sections follow: the first provides a comprehensive updating of the health consequences of active smoking and exposure to secondhand smoke, updating the many previous reviews; and the second details the current status of the epidemic, reviews the policy approaches that have proved effective for tobacco control, and offers a strategy and a vision for bringing this long-running epidemic to an end—the so-called “end game.”

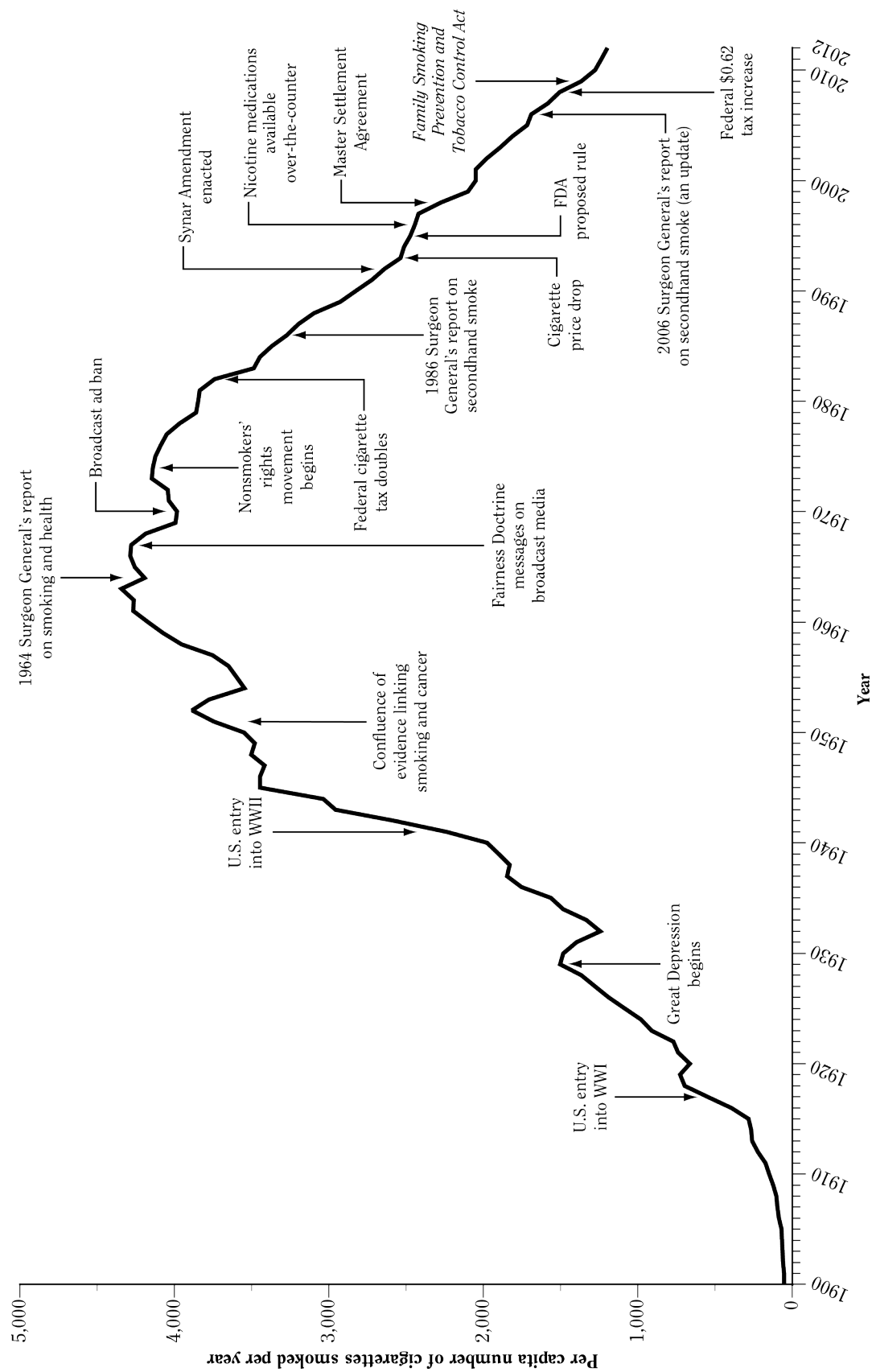
In offering a perspective on the long and complex story of the tobacco epidemic, this chapter is necessarily limited in its historical detail and does not follow the format of a detailed review of evidence that is typical of these reports. Lengthy and detailed historical accounts are available elsewhere (Kluger 1996; Brandt 2007; Proctor 2011). Americans’ behaviors, perceptions, attitudes, and beliefs toward the cigarette have changed dramatically since 1964 when the first report of the Surgeon General on smoking and health was released. At the time, 40% of Americans were regular smokers, with the majority of men (53%) and about one-third of women being regular smokers (U.S. Department of Health, Education, and Welfare [USDHEW] 1979). The smoking habit crossed socioeco-

nomic, gender, race, and ethnicity boundaries. Cigarette smoking was widely accepted, highly prevalent, and not discouraged in homes, and it took place in public spaces of all kinds, including hospitals, restaurants, airplanes, and medical conferences (Brandt 1990). Today, the prevalence of smoking among U.S. adults is about 20% (see Chapter 13, “Patterns of Tobacco Use Among U.S. Youth, Young Adults, and Adults”), and state and local laws have prohibited smoking in workplaces, restaurants, and bars in many regions of the country (see Chapter 14, “Current Status of Tobacco Control”). The majority of households are smoke-free and smoking is banned on airplanes worldwide (U.S. Department of Health and Human Services [USDHHS] 2006). Moreover, the rise and fall of smoking-caused diseases and premature deaths during the twentieth century generally follow patterns of changing tobacco-use behavior, albeit several decades later.

Although there had been previous statements on the harms of using tobacco, the 1964 report was significant for providing the most thorough and comprehensive review up to that time. However, translating this knowledge into action to benefit public health was not a simple or direct process. At the time of release of the 1964 report, the tobacco industry had a powerful influence and attempted to minimize the impact of the report using a broad set of strategies (Kluger 1996; Brandt 2007; Proctor 2011). That influence has now greatly declined, diminished by many factors, including trends in American culture, politics, economics, health care, and social life. This chapter addresses how the evolving scientific evidence on tobacco has been a key driver of the changes that have led to a dramatic shift in social norms around cigarette smoking.

During this same time span, 1964–2014, there have been striking changes in mortality rates from major diseases and substantial improvements in life expectancy (see Chapter 4, “Advances in Knowledge of the Health Consequences of Smoking: From 1964–2014”). These changes have been driven by many factors, including patterns of tobacco use across the twentieth century to the present. Mortality from cardiovascular diseases (CVD) dropped sharply and progressively, and rates for a number of cancers peaked and began to decline, most notably in men. By contrast, mortality from chronic obstructive pulmonary disease steadily climbed. Changes in the prevalence of tobacco smoking contributed to these shifts, but patterns of other risk factors also changed over the last 50 years, as programs addressed hypertension and other risk factors for CVD, and medications became available that reduced CVD, such as statins (Feinlieb et al. 1979; Stern 1979; Jemal et al. 2005; Ford and Capewell 2011).

Figure 2.1 Adult\* per capita cigarette consumption and major smoking and health events, United States, 1900–2012



Sources: Adapted from Warner 1985 with permission from Massachusetts Medical Society, ©1985; U.S. Department of Health and Human Services 1989; Creek et al. 1994; U.S. Department of Agriculture 2000; U.S. Census Bureau 2013; U.S. Department of the Treasury 2013.

\*Adults ≥18 years of age as reported annually by the Census Bureau.

## Tobacco Control: Before the 1964 Report

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To understand the transformative consequences of the 1964 report for tobacco control, this chapter begins with a description of the developments in tobacco control before 1964. Cigarette smoking grew rapidly in early twentieth century America with the arrival of technology for mass production and the development of a consumer culture and effective advertising and promotion on an unprecedented national scale (Figure 2.1) (Kluger 1996). At the same time, there was strong opposition to this trend from some groups, but early condemnations were often based on concerns about adverse moral and social impact rather than specific health effects (Best 1979). Additionally, concerns focused on specific groups seen to be especially vulnerable to the social and psychological effects of chronic cigarette smoking, notably youth and women. And unrestricted tobacco advertising, often with health-related claims, was seen as taking unfair advantage of those who were most vulnerable. In the first two decades of the century, an organized antitobacco effort developed, composed of temperance advocates, religious leaders, and health reformers (Kluger 1996). They were alarmed by the increase in cigarette smoking among youth and believed it to be associated with the abuse of alcohol and narcotic drugs. During this period, a total of 15 states banned the sale, manufacture, possession, or use of cigarettes. Many other states considered such legislation, and municipalities imposed additional restrictions on advertising, smoking near school buildings, and women smoking in public (Tate 1999).

Warnings about tobacco were offered by the Surgeon General before 1964. In 1929, Surgeon General Hugh S. Cumming warned about the hazards of tobacco claiming that excessive smoking caused nervousness, insomnia, and other ill effects in young women (Burnham 1989). Cumming warned that smoking could lower the “physical tone” of the nation. Like many physicians at the time, he believed that women were more susceptible than men to certain injuries, especially of the nervous system. But Cumming, a smoker, distanced himself from the more extreme antitobacco and temperance reformers of the time (Parascandola 1997).

Although physicians generally did not see a significant health threat for most smokers, there was growing concern over cigarette advertising during the 1930s and 1940s that made a wide array of unfounded health claims. In the highly competitive branded cigarette market, prominent advertising campaigns included explicit health claims: “Not a cough in a carload” (Old Gold) (U.S. Federal Trade Commission [FTC] 1964, p. LBA-5); “we

removed from the tobacco harmful corrosive acids (pungent irritants) present in cigarettes manufactured in the old fashioned way” (FTC, p. LBA-2); “Smoking Camels stimulates the natural flow of digestive fluids ... increases alkalinity” (Camel, p. LBA-1a) (FTC 1964). Kool menthol cigarettes, characterized by the cooling effect of this additive, were offered to nose and throat specialists to hand out to their patients “suffering from colds and kindred disorders” (*Information* 1948, Bates No. 400566440/6490, p. 9). FTC brought legal action against each of the major cigarette companies during the 1940s in an effort to curb health claims in advertising, resulting in a series of cease-and-desist orders. However, the agency’s power to control such advertising claims at the time was limited (FTC 1950a,b; *FTC v. P. Lorillard Co.*, 46 FTC 735 (1950); *FTC v. R.J. Reynolds Co.*, 46 FTC 706 (1950); *FTC v. American Tobacco Co.*, 47 FTC 1393 (1951); *FTC v. Philip Morris & Co.*, 49 FTC 703 (1952)).

By the 1930s, however, American scholars and activists had become aware of increasing cancer death rates. Statisticians in the insurance industry, such as Frederick L. Hoffman at Prudential Insurance Company, had amassed statistical data documenting the growing influence of cancer since the turn of the century, and voluntary organizations like the American Cancer Society had been using these data to bring public attention to the cancer problem (Patterson 1987). In the late 1930s, the government published cancer mortality statistics from 1900–1935 based on U.S. Census data and subsequently cause-specific mortality was tracked, providing an ongoing picture of mortality trends (Gover 1939).

Complementing these mortality statistics, some clinicians described a growing clinical experience with lung cancer patients and the surgical treatment of the disease by pneumonectomy, removal of a lung. Thoracic surgeon Alton Ochsner recounted being called as a medical student in 1910 to see an autopsy of a patient with lung cancer because such cases were so rare (Ochsner 1973). Several decades later, he began to see many such patients. Ochsner and DeBakey (1939) reported their experience with pneumonectomy for lung cancer and proposed that smoking contributed to the development of this malignancy: “In our opinion the increase in smoking with the universal custom of inhaling is probably a responsible factor, as the inhaled smoke, constantly repeated over a long period of time, undoubtedly is a source of chronic irritation to the bronchial mucosa” (p. 109). At the same time, smoking was clearly linked to decreased life expectancy by Pearl (1938), based on follow-up of adults in Baltimore.

Yet, there was also substantial skepticism within the medical community about whether the seeming increase in cancer deaths was real or an artifact of better diagnosis. The rise in lung cancer, a rare disease at the beginning of the twentieth century, drew particular scrutiny (Witschi 2001). However, the possibility of diagnostic bias was set aside through appropriate research and the continuing rise of lung cancer deaths made such diagnostic bias improbable (Macklin 1942; USDHEW 1964). A wide range of possible industrial and environmental causes were cited as possibly contributing to the increase, including road tars, vehicle exhaust, and air pollution, along with tobacco smoking (Witschi 2001).

Beginning as early as the 1920s, the rise of lung cancer prompted epidemiologic research on its causes that was carried out in the United States and Europe. These initial studies found an association between lung cancer and tobacco smoking that was repeatedly confirmed in a wave of research that began in the 1940s and continued in the 1950s (Witschi 2001). These studies were of the case-control design, involving comparison of the frequency and intensity of smoking by people with lung cancer to smoking among comparable people without lung cancer—the controls. By the early 1950s, in follow-up of the strong associations found in the case-control studies, cohort or follow-up studies were initiated that compared rates of lung cancer occurrence or death among smokers and nonsmokers. These epidemiologic studies provided the pivotal evidence on smoking and lung cancer for the 1964 report of the Surgeon General. The public responded to the new information on smoking and lung cancer with a slight decrease in consumption (from 1953–1954) that was quickly followed by a sharp rise (Figure 2.1).

The American tobacco industry's strategies for dealing with scientific evidence documenting the harms of its products also originated during the 1950s. By the early 1950s, the epidemiologic evidence on lung cancer and smoking was abundant and coherent, and Wynder and colleagues' (1953) mouse experiments had documented that cigarette smoke condensate caused tumors confirming earlier work by Angel H. Roffo (Proctor 2006). In a now well-documented effort to counter this evidence and to minimize risk to the industry, the executives of the major tobacco companies met in December 1953 and, with the guidance of the advertising firm Hill & Knowlton, devised a unified strategy that included the founding of an industry-funded research organization, initially

the Tobacco Industry Research Committee (TIRC) and later the Council for Tobacco Research (DATTA Collection 1953), and the nationwide publication of the "Frank Statement," which publicly stated the industry's commitment to public health (Pollay Advertising Collection, n.d.). Clarence Cook Little, a leading researcher and academician, was hired in 1954 as the first head of TIRC; he assumed a public position of skepticism with regard to the evidence on smoking and health, seeking to create doubt about the harmful effects of smoking (Brandt 2007; Proctor 2011). For decades, the industry followed the strategies set out in the early 1950s: denying the harms of its products, discrediting the scientific evidence that showed these harms, funding research that was intended to divert attention from cigarettes, and marketing new products with implied lower risks than existing products (*United States v. Philip Morris Inc.* 2006; Brandt 2007; Proctor 2011).

Generally, there was little response in the medical community to the first wave of studies on the risks of smoking. In 1953, in the midst of early reports on cigarette smoking and lung cancer, the American Medical Association (AMA) did announce that it would stop accepting cigarette (and alcohol) advertising in its journal beginning January 1, 1954 (*Advertising Age* 1953). However, the move was not an indication that AMA accepted that smoking was hazardous, but was primarily a response to the medical claims increasingly seen in cigarette advertising; pharmaceutical companies had reportedly complained to AMA that while their claims were subject to thorough scrutiny, cigarette manufacturers' claims were not (*Advertising Age* 1953). Cigarette manufacturers were also starting to worry that overt medical claims could backfire, drawing attention to the growing evidence of harms.

In summary, in the first half century of the cigarette epidemic, concerns about cigarette smoking often focused on the habit's impact on the social and moral fabric of society. Additionally, broader fears about the booming consumer culture and the ubiquitous advertising associated with it led to attempts to control or warn the public about misleading advertising claims. As long as consumers were protected from misleading claims, the decision to smoke or not smoke was one that the medical community had little to say about. But the emergence of strong evidence related to cancer and other health risks from cigarette smoking during the 1950s shifted the focus to the scientific evidence on its health effects, setting the stage for evidence-based action.

## Scientific Judgment and the 1964 Report

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By the late 1950s, the amassing evidence on smoking and lung cancer called for public health action. The Surgeon General was among the first authoritative figures to address the public health implications of the rising evidence on the health risks of smoking. Before the 1964 report was released, there had been several previous statements from the Surgeon General, several consensus statements from groups of public health scientists, and a report from the Royal College of Physicians (1962), all identifying cigarette smoking as a cause of lung cancer (Cutler 1955; Study Group on Smoking and Health 1957). These reports were based largely on epidemiologic studies, both case-control and cohort; on findings from laboratory studies using animals and pathology studies; on chemical identification of known carcinogens in cigarette smoke; and on analyses of large-scale patterns of cigarette consumption and disease rates (Proctor 2011). Although the case-control studies were questioned on methodological grounds, evidence from several cohort studies was reported in the 1950s that confirmed the strong association between smoking and lung cancer. In June 1954, the results from the first cohort assembled by the American Cancer Society, which included 180,000 older men, were announced (Hammond and Horn 1958). The study showed that heavy smokers were dying of lung cancer at a rate 5 to 16 times higher than that of similar people who were not smokers. At the same time, similar findings were reported from studies of British physicians (Doll and Hill 1954) and U.S. veterans (Dorn 1958, 1959). By 1959, Surgeon General Leroy E. Burney declared cigarette smoking “the principal [sic] etiological factor in the increased incidence of lung cancer” (Burney 1959, p. 1835). The same year, a review by leading public health scientists assessed a range of potential criticisms of the research findings and concluded that the evidence was overwhelming: “if the findings had been made on a new agent, to which hundreds of millions of adults were not already addicted, and on one which did not support a large industry, skilled in the arts of mass persuasion, the evidence for the hazardous nature of the agent would generally be regarded as beyond dispute” (Cornfield et al. 1959, p. 198).

Thus, the 1964 report’s most noteworthy finding—“Cigarette smoking is causally related to lung cancer in men; the magnitude of the effect of cigarette smoking far outweighs all other factors. The data for women, though less extensive, point in the same direction” (USDHEW 1964, p. 31)—had been anticipated in prior reviews. The report also concluded that “...cigarette smoking contributes substantially to mortality from certain specific

diseases and to the overall death rate” (USDHEW 1964, p. 31). However, the 1964 report went beyond these earlier reviews in its transparent methodology and depth of analysis, including a systematic gathering and review of the data and a synthesis of the findings for causality based on prior criteria. The members of the Advisory Committee were carefully selected to identify a panel that would be considered as free of any bias as to the report’s findings (Parascandola 1997). Its landmark status reflects this approach, which made it a model, not only for future reports of the Surgeon General, but for reviews in other fields.

The Surgeon General’s emphasis on methodology merits highlighting (see Chapter 3). The report devoted two chapters to describing the working methods of the group, and the criteria they employed, in making inferences about cause and effect relationships. The Committee cited five criteria for making a determination of causation from an observed association: consistency, strength, specificity, temporal relationship, and coherence (USDHEW 1964). For lung cancer in particular, the Committee discussed a range of different types of evidence in great detail, responding to alternative explanations for the high risk of lung cancer in smokers, other than smoking, and addressing inconsistencies in the total body of evidence. Although previous reviews had covered some of the same material and employed similar criteria, the Advisory Committee did so in a way that was more explicit and formal than previous inquiries. In the end, it was no single study, but the mass of cumulative evidence from diverse sources that made the case for smoking as a cause of lung cancer irrefutable (Parascandola et al. 2006).

This approach successfully addressed the new problem in public health of interpreting observational findings. The 1950s and 1960s were a critical time for a new application of epidemiology with a focus on chronic rather than infectious diseases, an emphasis on identifying individual risk factors for disease, and the use of advanced quantitative methodology (Morris 1957; Lilienfeld 1978). Chronic diseases such as cancer and heart disease required a new approach to understanding their etiology. Unlike traditional infectious disease research, where a single necessary causal agent or organism could be identified and studied in the laboratory and in the population, cancer was associated with a wide range of exposures and agents and developed over decades. The picture was quite similar for cardiovascular diseases and chronic lung disease. Human experiments could not be carried out to determine if particular agents had causal effects; instead, risk factors were

identified through observational epidemiologic research which is inherently subject to various sources of bias.

As a result, there was substantial debate about what type of evidence was needed to declare cigarette smoking a cause of lung cancer (Brandt 1990; Parascandola 2004). Some advocated for a narrow view of cause and effect, insisting it must be demonstrated that cigarette smoking is uniquely linked to lung cancer, the link must be demonstrated in a randomized trial, or additional evidence demonstrating underlying biological mechanisms was required (Yerushalmy and Palmer 1959; Parascandola 2011). The tobacco industry took advantage of the methodologic divide, insisting that epidemiology and statistics alone could not prove cause and effect and that a detailed understanding of the mechanisms of cancer etiology was required to support such claims (Little 1961). The dismissal of epidemiologic evidence as imperfect was a strategy used repeatedly by the tobacco industry, particularly in attempting to thwart the consequences of the studies linking exposure to secondhand smoke to lung cancer and other diseases (Kluger 1996; Brandt 2007; Proctor 2011). However, as the evidence on smoking and disease accumulated throughout the 1950s, many public health scientists increasingly insisted that such “logically rigorous” proof of causation, requiring demonstration of a necessary and sufficient cause, was not required (Cornfield et al. 1959).

In the 1964 Surgeon General's report, the Advisory Committee endorsed this conceptual approach, explaining that, in the absence of experimentation, the “causal significance of an association is a matter of judgment” (USDHEW 1964, p. 20). Additionally, they employed a more flexible, pragmatic definition of “cause,” which focused not on identifying a unique necessary and sufficient cause, as for infectious diseases, but on finding the modifiable multifactorial determinants of health outcomes with the ultimate aim of supporting prevention, an approach which was to be further developed by an emerging discipline of chronic disease epidemiology (MacMahon et al. 1960). The criteria for evidence evaluation offered flexibility for evidence interpretation that avoided the rigid requirements of the Henle-Koch postulates long used for infectious organisms (Evans 1976, 1978, 1993; Susser 1995).

The mechanism by which the report was produced gave it a status and authority beyond the previous reviews. When Surgeon General Luther Terry initiated the effort in 1962 at the request of President John F. Kennedy, he stated that the group would not conduct any new research or make any recommendations, but would provide an

“objective assessment of the nature and magnitude of the health hazard” (USDHEW 1964, p. 8). The 10 Committee members were selected from a list of about 150 eminent physicians and biomedical scientists from a variety of different disciplines. Major medical associations, volunteer public health organizations, the Tobacco Institute, the Food and Drug Administration (FDA), FTC, and the President's Office of Science and Technology were all given the opportunity to remove a name from the list for any reason (Terry 1983). Anyone who had taken a prior public position on any question of smoking and health would be eliminated from the list (Terry 1983). The members of the Committee held their meetings at the National Library of Medicine in Bethesda, Maryland, with their deliberations under strict secrecy and documents under lock and key. Even the Surgeon General himself knew nothing of the details of their work until the final report was being printed (Terry 1983). This approach, which did not directly involve Terry, contrasted with Burney's statements during the 1950s, which had been presented as the “opinions” of the Surgeon General and senior U.S. Public Health Service (PHS) leaders (U.S. Congress 1957).

The process used for the report marks the beginning of a new role for scientific experts in the United States. Allan M. Brandt (2007) refers to the era of “procedural science” and Robert N. Proctor calls the report a product of an “administrative rather than a scientific consensus” (Proctor 2011, p. 236). That is, the crucial science relied upon by the Advisory Committee had been already published; the authority of the report also rested on the characteristics of the process used in reaching its conclusions, which assured that conclusions were reached by considering the full range of evidence available and judging the evidence in a transparent and consistent framework. The explicit appeal to the process and criteria for judgment was novel at the time, but has since come to be standard practice for evidence reviews in controversial areas of medicine and public health. The industry's documents provide insights into how the industry viewed the 1964 report from the planning process through the report's development and release (Allen 1962; Cullman 1962; Hockett and Thompson 1962; Bass 1963; Hill & Knowlton 1963; Council for Tobacco Research 1964; Cullman 1964; Haas 1964; Pacey 1964; Wakeham 1964; Weissman 1964). Notably, the industry was treated as a stakeholder and given the opportunity to make recommendations on members of the Advisory Committee and to provide research materials to the Committee (Terry 1983).



## Remedial Action and Change Following the 1964 Report

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The 1964 Surgeon General's report concluded that "Cigarette smoking is a health hazard of sufficient importance in the United States to warrant appropriate remedial action" (USDHEW 1964, p. 33). However, the report did not specifically state what actions should be taken and lacking any precedent at the time, it was not immediately clear what form this action should take. Surgeon General Luther Terry had initially outlined two distinct phases of inquiry. The first was an expert committee to provide an "objective assessment of the nature and magnitude of the health hazard" (USDHEW 1964, p. 8). The second phase, which would provide recommendations for action and require a different range of expertise, would follow, although this effort never fully materialized.

During the 1950s, federal public health officials saw their role as limited. Alexander Langmuir, who pioneered in disease surveillance at the Communicable Disease Center (now known as the Centers for Disease Control and Prevention [CDC]), viewed the role of public health researchers as generating evidence for others who make policy decisions: "When major health problems arise, someone must make decisions. This is not the primary responsibility of the epidemiologist. Administrative and political as well as technical considerations must also be brought to bear. It is the epidemiologists' function to get the facts to the decision makers" (Langmuir 1963, p. 191). Testifying before Congress in 1957, Surgeon General Leroy Burney insisted it was the role of PHS to present the facts as they became available to state health agencies, and sometimes the national media, but not to undertake an organized national educational campaign. He added, "We should not go all out on a campaign and put stickers on cigarettes and certain other things" (Burney 1957b, p. 24). When Burney released official statements on smoking and health in 1957 and 1959, they appeared in academic medical journals and were sent out to state public health officers and to AMA, but not to the general public. The statements received little public attention. Thus, although Burney (1957a) was unequivocal on the weight of the evidence, this judgment on the association of smoking with lung cancer did not necessarily translate into a call for action, even action to educate the public (*New York Times* 1957; Fritschler 1969). This approach contrasted sharply with Luther Terry's dramatic, nationally televised press conference in 1964. The 1964 report spoke with far more certainty than Burney's earlier publications, which were brief and had a more limited evidence base. Additionally, the 1964 report had been requested by President Kennedy and it was an unprecedented review of a public health

threat. Consequently, the release of the report was carefully managed with the media response in mind. The press conference was held on a Saturday to minimize the effects of the report on the stock market and to ensure coverage in the Sunday newspapers (Parascandola 1997). All of the approximately 200 reporters attending were required to remain for the entire session. Each was given a copy of the final report and allowed to study it for an hour. Reporters were then permitted to question the Surgeon General and the Administration. Finally, the doors were opened and reporters raced out to file their stories (Parascandola 1997). The report received enormous publicity. *Newsweek* lauded it as "monumental" and subsequently the report has been named by the New York Public Library as one of the top 100 books of the twentieth century (Diefendorf 1996). Terry made the Surgeon General into a public figure, no longer an anonymous government official; his use of the media to address national public health issues would be taken up and further developed by later Surgeons General.

Nevertheless, while the report was to lead to action, health officials and political leaders still saw a carefully circumscribed role for federal intervention on smoking and health. Secretary of Health, Education, and Welfare Anthony J. Celebrezze had already stated his views on the government's responsibilities even before the Committee began its work: "I firmly believe that it is not the proper role of the federal government to tell citizens to stop smoking" (Toth 1962, p. 20). The proposals that emerged were primarily aimed at ensuring that consumers had accurate information with which to make decisions about their own behavior. At the time, of course, the addictive potential of nicotine in tobacco smoke was not generally known. Government had a role in protecting consumers from industry abuses, such as fraudulent advertising, but not in intervening to change consumer behavior. For example, Senator Maurine Neuberger urged FTC to require cigarette manufacturers to state tar and nicotine yields on advertisements and cigarette packages to "stimulate the development of less hazardous cigarettes and facilitate intelligent choice between competing brands on the basis of relative safety" (Neuberger 1964, p. 1). But proposals to give FDA regulatory authority over tobacco products were rejected by federal public health officials as impractical and contrary to what the public would accept (U.S. Congress 1964, 1965).

Congress did enact legislation to educate consumers about the hazards of smoking. In 1965, the *Federal Cigarette Labeling and Advertising Act of 1965* mandated

the first Surgeon General's warning to appear on cigarette packages: "Caution: Cigarette Smoking May Be Hazardous to Your Health." It called for an annual report to Congress on the health consequences of smoking and for the Secretary of Health to make recommendations for needed legislation. In October 1965, PHS created the National Clearinghouse on Smoking and Health. This office was to play a key role in the development of the first 10 Surgeon General's reports (1967–1978) as well as development of national informational and educational programs about the risks of smoking. However, at the same time it prohibited FTC from taking any new regulatory action to control cigarette advertising for 4 years. Contemporary observers explained that the tobacco industry had decided it was in their interest to accept the warning label in exchange for halting any regulatory efforts (Drew 1965). However, subsequent analyses have shown how the tobacco industry used its connections within government to assure a weak bill and a weak warning label (Brandt 2007). The wording of the label, "Caution: Cigarette Smoking May Be Hazardous to Your Health," contrasts sharply with the certainty of the 1964 report's conclusion on smoking and lung cancer.

Subsequent government actions were largely focused around promoting public information about the risks of cigarette smoking and how they might be reduced. The Surgeon General convened another group of experts in 1966 to assess the importance of different constituents identified in cigarette smoke for disease risk; the group recommended that actions be encouraged to progressively reduce the tar and nicotine content of cigarette smoke (*Congressional Record* 1966). At the same time, FTC revised its advertising guidelines to permit manufacturers to include in advertisements "a factual statement of the tar and nicotine content (expressed in milligrams) of the mainstream smoke from a cigarette" (Shea 1966, Bates No. 00065004). Eventually, this disclosure became mandatory. In 1968, the National Clearinghouse for Smoking and Health, a government office, began a campaign "If You Must Smoke ..." aimed at people who wanted to reduce their risk but did not want to quit smoking. The pamphlet provided five suggestions: (1) choose a cigarette with less tar and nicotine, (2) don't smoke the cigarette all the way down (the last few puffs have more tar and nicotine), (3) take fewer draws, (4) reduce inhaling, and (5) smoke fewer cigarettes (USDHEW 1968). In the absence of any authority to mandate changes in the product, public education became the primary tool to reduce risk.

However, one initiative that had a measurable impact on the prevalence of smoking was initiated by John

F. Banzhaf III, a consumer lawyer. In 1967, Banzhaf successfully petitioned the Federal Communications Commission (FCC) to apply the Fairness Doctrine<sup>1</sup> to cigarette advertising to counter the tobacco industry's advertising messages (*Banzhaf v. FCC*, 405 F.2d 1082, 1086 [D.C. Cir. 1968], cert. denied, 396 U.S. 842, 90 S. Ct. 50 [1969]; USDHHS 2000). After a court struggle, the national networks were forced to air antismoking advertising spots in prime time, giving tens of millions of dollars' worth of free airtime to antismoking efforts. In 1968, 1,300 antitobacco messages were aired by the three major networks (Lewit et al. 1982). These public service announcements may have contributed to a reduction of overall consumption; per capita cigarette consumption fell from 4,197 in 1966 to 3,969 in 1970 (Figure 2.1). The effect was short-lived, however, as tobacco companies were mandated to take their ads off the airwaves in 1971 following the *Public Health Cigarette Smoking Act of 1969*, which included a prohibition on broadcast advertising of cigarettes. Consequently, the antismoking advertisements were no longer required under the Fairness Doctrine and cigarette consumption rose after they ended (Warner 1979).

From about the time of the 1964 report, per capita cigarette consumption began to decline in the United States (Figure 2.1), but not uniformly across the population. Physicians and other health professionals had begun to accept the evidence and to stop smoking even before the release of the 1964 report. While 60% of physicians smoked in 1949, this figure declined to 30% by 1964 (Garfinkel and Stellman 1976). Surveys of Massachusetts physicians during the 1950s found that by 1954 a majority of physicians (55% of smokers and 63% of nonsmokers) believed that "heavy smoking of cigarettes may lead to lung cancer" (Snegireff and Lombard 1954, p. 1042). Some had switched to smoking only a pipe or cigars, and many who continued to smoke had reduced the number of cigarettes they smoked. Ninety-three percent of the respondents supported antitobacco education efforts for youth, and those who did not said it was not because they doubted the harms of smoking, but because they doubted the effectiveness of educational efforts to change teenagers' behavior (Snegireff and Lombard 1959).

Surveys of physicians during the 1960s continued to show decreasing prevalence of smoking and acceptance of the hazards of cigarette smoking (Buechner et al. 1986). A 1965 survey of Oregon physicians found that more than one-third (36%) had modified their tobacco consumption in response to the 1964 report. Additionally, although many physicians had quit earlier, those who quit before 1964 were more likely to cite physical symptoms as

<sup>1</sup>An FCC regulation that required broadcasters to allot time to contrasting points of view on controversial topics.

the reason while, after 1964, former smokers were more likely to cite scientific evidence of harm as their reason for quitting (Meighan and Weitman 1965). The prevalence of smoking was also dropping rapidly among medical trainees and younger physicians. The average prevalence of smoking among medical students at Johns Hopkins Medical School was 65% for the years 1948 through 1951, but by 1965 the prevalence had dropped below 40% (National Cancer Institute [NCI] 1994). Younger physicians were also more likely to report concern over the health effects of smoking on patients, to ask or advise patients about their smoking, and to agree that physicians should set an example by not smoking (Coe and Brehm 1971). By the early 1980s, surveys suggested that only 5–10% of physicians were smoking (Sachs 1983; Buechner et al. 1986). In 2006–2007, the prevalence of current smoking among physicians had reached about 2% (Sarna et al. 2010).

Appreciation of the health risks, and subsequent behavior change, was slow to follow among the general population. Gallup polls have surveyed Americans about their beliefs on the health effects of smoking since the 1950s (Gallup Organization 1964). In 1954, 70% of respondents believed that smoking was harmful to health. However, the question—“Do you think cigarette smoking is harmful, or not?”—was phrased in such a general way as to encompass a wide range of possible effects. Respondents were also specifically asked about lung cancer. Although 83% of respondents answered ‘yes’ to the question “Have you heard or read anything recently that cigarette smoking may be a cause of cancer of the lung,” only 41% answered ‘yes’ to the next question “What is your opinion -- do you think cigarette smoking is one of the causes of lung cancer.” When respondents were asked about specific health effects from smoking, only 7% mentioned cancer of any kind. Instead, most cited a variety of non-life-threatening problems such as coughing, sinus irritation, nervousness, and fatigue (Saad 2002).

Even after the 1964 report, there was not a dramatic change in public beliefs about smoking. In a 1966 Harris poll, only 40% recognized smoking as a major cause of lung cancer, 27% considered it a minor cause, and one-third were uncertain, saying that “science had not yet determined the relation between smoking and lung cancer” (Saad 1998, p. 3). In general, although there was widespread awareness of reports of findings on smoking and health, including lung cancer, people were unsure whether to believe the results were conclusive. This uncertainty may have reflected, at least in part, the doubt-creating strategies of the tobacco industry (Proctor 2011).

Some early studies hinted at the complexity of beliefs about health risks and the factors determining those beliefs. For example, having a higher education level among nonsmokers was associated with acceptance

of statements that a link between smoking and health had been proven; but among smokers, the relationship was the opposite, and smokers with a higher education level were more likely to be skeptical of the evidence (Cannell and MacDonald 1956). In another study, a survey found that male smokers were relatively optimistic about their chances of contracting cancer, while female smokers were not (Toch et al. 1961). And a 1963 study found that awareness of science reporting had little impact on smoking behavior, as many smokers were prone to doubt the scientific claims or exhibit fatalistic attitudes about health risks (Robinson 1960). It was not until the 1970s that a majority of Americans said smoking was a cause of lung cancer. But the proportion with this view climbed steadily from about 70% during the 1970s to about 80% in the 1980s. By the 1990s, Gallup polls consistently showed 95% of Americans claiming to believe cigarette smoking to be harmful to health and 90% believing it to be a cause of lung cancer (Saad 1998; Moore 1999).

Cigarette consumption was similarly slow to change. Per capita consumption figures increased every year from 1950 to 1963, with the exception of 1953 and 1954, when there was the first widespread publicity on early laboratory animal and human cohort study findings (Figure 2.1). Consumption decreased in 1964 and during all of the Fairness Doctrine years of 1967–1970. Since 1973, every year for which data are available has seen declines in per capita adult cigarette consumption (U.S. Department of Agriculture 2007; U.S. Census Bureau 2013; U.S. Department of the Treasury 2013).

Although antismoking publicity and news reports did have an impact on beliefs and behavior over time, there were also forces working against this trend. In particular, the tobacco industry’s marketing efforts and organized campaign to promote doubt around smoking and health surely slowed the pace of change. A 1966 PHS survey found that more than 60% of smokers agreed that the cancer link was “not yet proved” because it was “only based on statistics” (National Clearinghouse for Smoking and Health 1969, p. 743). Additionally, well over one-half of all smokers believed that most people would not be convinced smoking was harmful until “the tobacco industry itself” admitted the fact (USDHEW 1969). Even as public knowledge about the link between smoking and lung cancer became widespread during the 1970s and 1980s, a 1981 FTC review concluded that many Americans still had very limited knowledge of the nature and extent of the health risks or how those risks applied to their own behavior (FTC 1981).

The nature of cigarette advertising also changed, apparently in response to adverse publicity, to obscure the extent of the danger. During the 1970s, there was an increased emphasis on ads that featured claims about tar

and nicotine content, implying reduced exposures to cancer-causing agents (NCI 2001). Key words such as “light,” “smooth,” and “mild,” were used to convey health-related messages (Kozlowski 2010). In the 1980s, these health messages became more subtle, relying on imagery of active, healthy models (Warner 1985b).

Additionally, the tobacco industry's power as a source of revenue for many print publications influenced the content of smoking and health media coverage (USDHHS 1989; NCI 2008). After the broadcast advertising ban, cigarette advertising and marketing continued to grow, but shifted to print publications, outdoor billboards, sponsorship of sports, placement of brand implants in movies, and a number of other methods. According to *Advertising Age*, the five major tobacco companies spent \$62 million on magazine advertising in 1970, the year before the ban, but by 1976 they were spending \$152 million (Smith 1978). Some publications became highly dependent on this revenue. An article in the *Columbia Journalism Review* noted a trend: “In magazines that accept cigarette advertising,” Smith (1978) wrote, “I was unable to find a single article, in seven years of publication, that would have given readers any clear notion” of the nature and extent of the health effects of cigarette smoking, including news magazines like *Time* and *Newsweek*. As late as 1983, a *Newsweek* 16-page special supplement on “personal health care” prepared with AMA failed to explicitly identify cigarette smoking as a major health hazard. The same issue carried 12 pages of cigarette advertisements worth about \$1

million in revenue for the magazine (Warner 1985a). An analysis of magazine coverage over a 22-year period found that a sample of major magazines reduced their coverage of smoking and health issues by 65% in the years after the broadcast advertising ban went into effect (Warner and Goldenhar 1989), and another study found that magazines which accepted an average amount of cigarette advertising were 38% less likely to carry stories on smoking and health than magazines that did not accept cigarette advertising (Warner et al. 1992).

Although many individual physicians rapidly accepted the smoking and health findings, AMA, the leading professional medical organization, took more than two decades to take a clear stand on the issue. In 1964, after the release of the report of the Surgeon General, AMA published a 7-page brochure for the general public titled “Smoking: Facts You Should Know,” which described a range of “suspected health hazards” but portrayed experts as divided on the issue (AMA 1964). At the time, AMA officials also opposed federal efforts to mandate warning labels, advertising restrictions, or other public education efforts around smoking (Haseltine 1964). Historians have noted that AMA's position on smoking during the 1960s and 1970s was influenced by its need for support from congressional allies, particularly in southern tobacco-growing states, as well as its opposing Medicare and proposed national health insurance legislation during those years (Kluger 1996; Rothstein 2003; Proctor 2011).

## Passive Smoking and Environmental Change

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Surgeon General Jesse L. Steinfeld, appointed by President Richard M. Nixon in December 1969, helped to bring public attention to the effects of smoking on non-smokers. Although he had more limited authority compared with his predecessors due to a reorganization within USDHEW, he made use of the public platform of the Office of the Surgeon General to advance public health. He rein-vigorated the regular reports of the Surgeon General on smoking and health, involving dozens of outside experts as authors and peer reviewers to produce a 458-page report in 1971 and the first report to address passive smoking in 1972 (see Chapter 3).

In a 1971 address to the Interagency Council on Smoking and Health, Steinfeld asserted that “Nonsmokers have as much right to clean air and wholesome air as smokers have to their so-called right to smoke, which I would redefine as a ‘right to pollute’ ” (Steinfeld 1971,

Bates No. 91018247/8260, p. 14). He then went on to propose “It is high time to ban smoking from all confined public spaces such as restaurants, theaters, airplanes, trains, and buses. It is time that we interpret the Bill of Rights for the Non-smokers as well as the Smoker” (Steinfeld 1971, Bates No. 91018247/8260, p. 14). The subsequent 1972 report was the first in the series to identify the exposure of nonsmokers to cigarette smoke as a health hazard (USDHEW 1972). Dr. Steinfeld bluntly affirmed in his remarks when releasing the report “There is no disagreement – cigarette smoking is deadly” (Steinfeld 1972, Bates No. TITX0004900/4909, p. 2). In a chapter titled “Public Exposure to Air Pollution from Tobacco Smoke,” the report summarized information on the contamination of indoor environments by tobacco smoke. The review showed that levels of carbon monoxide in a smoke-filled room could reach concentrations equal to and even above

standards for ambient air. The report also concluded the tobacco smoke was a source of discomfort for many people, but characterized the health risks of tobacco smoke in the air as unknown. Steinfeld continued to be outspoken and an advocate for smoking bans and, unlike his predecessors, he refused to meet with tobacco industry representatives (Kluger 1996).

A grassroots movement emerged in the early 1970s to promote the interests of nonsmokers. Influential early organizations included Group Against Smoking Pollution, with chapters in several states and Californians for Non-Smokers Rights (now known as Americans for Non-smokers Rights) based in Berkeley, California. They drew explicitly on the rhetoric and discourse of the civil rights and environmental movements, referring to “the innocent victims of tobacco smoke” and a need to give the “right to breathe clean air” precedence over “the right of the smoker to enjoy a harmful habit” (Nathanson 1999). At the time, there was little data on the harms of exposure to secondhand smoke. However, an increasing number of nonsmokers viewed it as an annoyance in shared spaces, such as restaurants and airplane cabins. And the existence of a potential risk, however uncertain or small, was viewed in a fundamentally different way when it affected involuntarily exposed bystanders, some of whom might be susceptible to the effects (Bayer and Colgrove 2002).

A wave of new rules and legislation limiting smoking followed (USDHHS 2006). Several were at the federal level. In 1973, the Civil Aeronautics Board, which had jurisdiction, ordered domestic airlines to provide separate seating for smokers and nonsmokers. In 1974, the Interstate Commerce Commission ruled that smoking be restricted to the rear 20% of seats in interstate buses. Pioneering actions on indoor spaces were also taken at the local and state levels in the 1970s (USDHHS 2006). In 1973, Arizona became the first state to restrict smoking in some public spaces. In 1974, Connecticut enacted the first statute to restrict smoking in restaurants. Minnesota followed in 1975, requiring no-smoking zones in buildings open to the public. In 1977, Berkeley, California, became the first city to pass an ordinance limiting smoking in restaurants. At the same time, antismoking efforts in the United States began to develop into a more diverse movement, involving a broad constituency of volunteer health organizations, professional organizations, and newly created advocacy groups, such as Doctors Ought to Care created in 1977 (USDHHS 2006).

When lawyer Joseph A. Califano, Jr., became Secretary of the Department of Health, Education, and Welfare under the incoming Carter Administration, he made a strong antismoking campaign one of his first priorities. On January 11, 1978, Califano outlined his battle plan in a public speech in which he called cigarette smoking

“Public Health Enemy Number One” and “slow motion suicide” and declared: “The first and most important element of this new program on smoking and health will be a major public information and education effort against smoking” (Califano 1978, p. 10). Califano’s actions did not develop in a vacuum, however. They reflected a growing national agenda of public health advocacy against smoking (National Commission on Smoking and Public Policy 1978).

The 1979 Surgeon General’s report, *Smoking and Health*, released under Califano, marked the 15-year anniversary of the original 1964 report. The report included more than 1,100 pages and presented an enormous amount of data from now decades-long epidemiologic cohort studies, studies of mechanisms of disease, studies of behavioral and psychosocial influences on tobacco use, and the effectiveness of education programs and interventions. It included a chapter titled “Involuntary Smoking” that summarized the data on contamination of indoor environments by tobacco smoke. The report also reviewed the initial evidence on the health consequences of involuntary smoking, but called for more research without reaching any conclusions as to risks (USDHEW 1979).

In the Secretary’s Foreword to the volume, Califano wrote: “But why, the reader may nevertheless ask, should government involve itself in an effort to broadcast these facts and to discourage cigarette smoking? ... Why, indeed? For one reason, because the consequences are not simply personal and private. Those consequences, economic and medical, affect not only the smoker, but every taxpayer” (USDHEW 1979, p. ii). That is, smoking went beyond being a private medical concern to being a major public health problem that affected smokers and nonsmokers. In particular, Califano cited two health policy challenges then facing the nation—the spiraling costs of health care, with a substantial portion borne by the federal government, and the fact that the health care system “overemphasizes expensive medical technology and institutional care, while it largely neglects preventive medicine and health promotion” (USDHEW 1979, p. ii). Smoking is, he noted, “the largest cause of preventable death in America” (USDHEW 1979, p. ii). At the same time, Califano acknowledged limits to government’s role in regulating cigarette smoking in a free society and suggested that intervention would have to focus primarily on research, education, and persuasion. The report also brought a renewed focus to the need for understanding smoking behavior and how to help people who want to quit. Thirty million Americans, the report stated, had become former smokers since 1964, and this figure gave encouragement that persuasion and education could have population-level impacts (USDHEW 1979). The report also highlighted the effects of smoking for specific vulnerable or high-risk populations,



including women, youth, minorities, the developing fetus, and certain occupational groups. In this way, too, government intervention was seen as justified by the need to protect those who are most vulnerable or at increased risk. In his preface, Surgeon General Julius B. Richmond similarly highlighted the difficulty of seeing smoking as simply a personal choice, given the hundreds of millions of dollars spent each year in marketing and promotion of cigarettes and the possibility that “nicotine is a powerful addictive drug” (USDHEW 1979, p. xv).

At this time, the scientific evidence on the health effects of exposure to secondhand smoke was limited. Studies starting in the late 1960s had shown adverse effects of maternal smoking on the developing fetus and on children exposed to secondhand smoke in smoking households (Comstock and Lundin 1967; Colley et al. 1974). However, it was not until the following decade that a critical mass of scientific evidence emerged linking exposure to secondhand smoke with cancer and other chronic health effects among nonsmoking adults. In 1980 and 1981, scientific journals published epidemiologic research from Greece, Japan, and the United States finding that those who breathed “environmental tobacco smoke” suffered from decreased lung function (White and Froeb 1980) and increased risk of lung cancer (Hirayama 1981; Trichopoulos et al. 1981). Because the lung cancer investigations involved people who had experienced heavy exposure to smoke in the home over long periods of time, there were questions about whether, and to what extent, the data could be extrapolated to other enclosed public spaces. But over the next several years, additional studies gave weight to the argument that adult nonsmokers suffered harm by breathing the cigarette smoke of others and that smoking by parents adversely affected the respiratory health of their children. In 1986, two major scientific reviews were released in the United States—the U.S. Surgeon General’s report, *The Health Consequences of Involuntary Smoking* (USDHHS 1986), and the National Academy of Science’s report, *Environmental Tobacco Smoke: Measuring Exposures and Assessing Health Effects* (National Research Council 1986)—both concluding that secondhand smoke could cause lung cancer in healthy adult nonsmokers and respiratory symptoms in children. In that same year, the World Health Organization’s (WHO’s) International Agency for Research on Cancer (IARC) concluded that “... passive smoking gives rise to some risk of cancer” (IARC 1986, p. 314).

The 1986 report of the Surgeon General on involuntary smoking represents another landmark in the series of reports. Following the approach of the 1964 report, it assembled the full body of evidence on exposure to secondhand smoke and health, reviewing the composition of

tobacco smoke, dosimetry and toxicology, exposures, and the findings of epidemiologic studies (USDHHS 1986). It interpreted that evidence within the context of what was already known about active smoking, treating exposure to secondhand smoke as resulting in a lower dose of tobacco smoke, compared with active smoking, but to the same toxic mixture from a health perspective. The report had three overall conclusions, including its powerful first conclusion: “Involuntary smoking is a cause of disease, including lung cancer, in healthy nonsmokers” (USDHHS 1986, p. 7). Its second conclusion described the adverse effects of smoking by parents on the respiratory health of their children. Its third—“Simple separation of smokers and nonsmokers within the same air space may reduce, but does not eliminate, exposure of nonsmokers to environmental tobacco smoke” (USDHHS 1986, p. 7)—carried implications for controlling exposure to an agent identified as carcinogenic in the first conclusion.

Surgeon General C. Everett Koop, appointed by President Ronald W. Reagan in 1981, used the visibility of the position to a greater degree than any of his predecessors and used the findings of the report to call for smoke-free public places. He was an outspoken public foe of tobacco, advocating a smoke-free environment by the year 2000. Although he was aware of the controversy surrounding the scientific evidence on secondhand smoke, further fueled by the tobacco industry’s efforts to focus attention on the limitations of the data, he insisted that the data were sufficient for public health intervention. Koop declared in his Preface to the 1986 report “Critics often express that more research is required, that certain studies are flawed, or that we should delay action until more conclusive proof is produced” (USDHHS 1986, p. xi). He went on to argue, based on the report’s third overall conclusion, that many of the measures that had been put into place in many states and communities were inadequate, such as creating separate nonsmoking sections with a common ventilation system did not eliminate exposure for nonsmokers. Koop also asserted that “[t]he right of smokers to smoke ends where their behavior affects the health and well-being of others (USDHHS 1986, p. xii).

This report, along with the complementary findings of the reports from the National Academy of Science and IARC, provided the scientific foundation for policies and actions to protect nonsmokers from inhaling tobacco smoke (NRC 1986; USDHHS 1986). By the mid-1980s, almost all states had enacted some restrictions on where people could smoke in public; some 80% of the U.S. population lived in areas covered by such laws (USDHHS 2006). Between 1985–1988, the number of communities around the country that had enacted laws restricting public smoking almost quadrupled, to over 300 (USDHHS 1989).

In 1987, USDHHS established a smoke-free environment in all of its buildings nationwide, extending protection to more than 100,000 federal employees (USDHHS 2006). In 1988, Congress imposed a smoking ban on all U.S. domestic flights of 2 hours or less. Two years later, the ban was extended to flights of 6 hours or less, in effect banning smoking on all domestic flights.

Once these efforts gained momentum, new legislation spread rapidly. The recognition of exposure to secondhand smoke as a health risk to nonsmokers meant that the issue was no longer merely one of individual choice. People responded differently to risks that were imposed on them involuntarily. The existence of victims of cigarette smoking fundamentally altered the discussion about the right to smoke, and state and legal intervention was seen as entirely appropriate. There was also substantial public support for enacting restrictions on smoking in public spaces. As early as 1970 (before any Surgeon General had spoken out about harm to nonsmokers), 58% of men who had never smoked and 72% of women who had never smoked responded ‘strongly agree’ or ‘agree’ that smoking should be allowed in fewer public spaces than it was at the time (USDHEW 1973a, p. 11). More than three-quarters of those who had never smoked felt that it was “annoying to be near” someone who was smoking (USDHEW 1973a, p. 13). A 1983 Gallup poll found that 82% of nonsmokers believed that smokers should not smoke in their presence and that smoking posed a health hazard for them; 64% of smokers concurred (American Lung Association 1983). Additionally, the phenomenon may have been self-reinforcing, acting as a sort of contagion effect where actions on one locale influenced other locales (Asbridge 2004). The attention to secondhand smoke was also aided by the growth in public concern over environmental pollutants during the 1970s. In 1970, under the Nixon Administration, both the U.S. Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration were created, and the *Clean Air Act Extension of 1970* established comprehensive regulatory control on outdoor air pollution. The following years saw a wide range of new environmental and safety laws aimed at protecting the public from involuntary risks, including, for example, the *Consumer Products Safety Act* (1972), the *Safe Drinking Water Act* (1974),

Amendments to the *Federal Food, Drug, and Cosmetic Act of 1938*, and the *Toxic Substances Control Act* (1976), creating new agencies and greatly expanding the regulatory authority of some existing agencies. In 1992, EPA carried out a risk assessment and classified environmental tobacco smoke as a human carcinogen, Group A under its carcinogen assessment guidelines (USEPA 1992).

The emerging evidence on exposure to secondhand smoke and disease, particularly lung cancer, sparked a vigorous response from the tobacco industry that is now well documented (Brandt 2007; Proctor 2011). The tobacco industry recognized the policy implications of evidence showing that exposure to secondhand smoke caused adverse effects among nonsmokers and initiated strategies to undermine the research findings, seeking to create doubt about the credibility of evidence that would drive policy-making (*United States v. Philip Morris Inc.* 2006; Brandt 2007; Proctor 2011). The first major study to link exposure to secondhand smoke to lung cancer, the cohort study carried out in Japan by Hirayama (1981), was the target of an orchestrated campaign to undermine its findings. The tactics included arranging critical letters to the editor of the *British Medical Journal*, which published the paper, commissioned research with the intent of obtaining findings that would point to bias in the study, and even newspaper advertisements discrediting the findings. Such strategies were directed at the wider body of evidence on secondhand smoke and health; the industry and its consultants raised methodologic problems, such as uncontrolled confounding and exposure measurement error, in order to sustain doubt about the findings (Kluger 1996; Proctor 2011).

These same tactics and others were used to try and diminish the impact of the 1986 Surgeon General’s report. An attempt was made to engage some of the report’s authors in a symposium that had undisclosed tobacco industry sponsorship. The report was characterized as political rather than scientific, and Surgeon General Koop’s motives were questioned. The attack on the scientific foundation of the report intensified as well (Proctor 2011). Some of these same strategies were used subsequently in an attempt to derail EPA’s risk assessment of environmental tobacco smoke.

## Nicotine and Addiction

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An estimated 30 million people quit smoking in the decade following the 1964 report. Organized programs to help people quit smoking, such as the Five-Day Plan, had gained popularity, and by 1970 there was a US\$50 million a year industry of for-profit smoking cessation programs, including Smoke watchers, Quit Now, SmokeEnders, and Schick Centers for the Control of Smoking, but there was little rigorous testing of the effectiveness of these programs (Goodman 2005). Additionally, throughout the 1960s and 1970s, the general understanding of smoking behavior and nicotine addiction was very limited. At the time, health scientists viewed smoking as primarily psychological and social, rather than pharmacological or biological. The 1964 report concluded that tobacco dependence should be characterized as a form of habituation rather than addiction (USDHEW 1964), drawing on a distinction established by WHO in 1957. That definition emphasized the physical effects of the drug, the compulsion to obtain it at any cost, and the habit's detrimental effects on the individual and society (WHO 1957). The WHO Expert Committee on Addiction-Producing Drugs observed that for cigarette smoking, evidence was lacking at the time for a typical abstinence syndrome. "In contrast to drugs of addiction, withdrawal from tobacco never constitutes a threat to life," they wrote. "These facts indicate clearly the absence of physical dependence" (USDHEW 1964, p. 352). At the same time, because regular smoking was so widespread and socially accepted during the 1960s, scientists were reluctant to portray smokers as addicts or as presenting a threat to society. Maurice H. Seevers, the only pharmacologist on the Surgeon General's Advisory Committee, had served on WHO's expert committee that produced the 1957 definition of addiction and was a longtime proponent of the view that an observable physical abstinence syndrome was a crucial defining feature of addiction (Rasmussen and Seevers 2009). It would be another decade before federal research funders and public health scientists created an organized research program around smoking dependence and nicotine addiction. In the mid-1970s, scientists were beginning to compare tobacco smoking with other drug addictions. For example, Jerome H. Jaffe, who had promoted methadone treatment for heroin addicts as President Richard M. Nixon's drug czar from 1971–1973, began to argue in favor of treating cigarette smoking as an addiction in the mid-1970s, maintaining that it did meet the appropriate criteria, including the presence of a withdrawal syndrome. "The major difference between tobacco dependence and other drug addic-

tions," he stated, "is tobacco's social acceptability" (Jaffe 1977, p. 627).

By the late 1970s, as smoking behavior was increasingly recognized as resembling that of other drug addictions, an organized research effort began (Jarvik et al. 1977). A substantial portion of the 1979 Surgeon General's report was devoted to behavioral aspects of smoking (USDHEW 1979); indeed, of the 11 Surgeon General's smoking and health reports published between 1964–1980, it was the first to include any mention of smoking behavior or dependence. The authors of the report sought to avoid using the term addiction, not because they believed it to be scientifically inaccurate, but because of its loaded meaning related to illicit drug use (Henningfield and Zeller 2006). It was not until the 1988 report that the Surgeon General declared that cigarettes are addicting, similar to heroin and cocaine, and that nicotine is the primary agent of addiction (USDHHS 1988).

The focus on the behavioral and psychological aspects of cigarette smoking and addiction marked a substantial shift from the earlier science of smoking and health. Researchers studying the health effects of smoking during the 1960s and 1970s were primarily epidemiologists, statisticians, and pathologists without expertise in studying addictive behavior. These researchers were focused on the consequences of smoking and not on why people smoked. During the 1970s, scientists who had studied other drug addictions turned their attention to cigarette smoking, developing methods to measure nicotine intake and smoking behavior. A substantial body of evidence resulted.

The 1988 report of the Surgeon General, also released by Surgeon General Koop, reviewed this new evidence on smoking and addiction, concluding that: "Cigarettes and other forms of tobacco are addicting" (USDHHS 1988, p. 9) and "Nicotine is the drug in tobacco that causes addiction" (p. 9). The third overall conclusion compared nicotine addiction to other addicting drugs, including heroin and cocaine.

The report changed the view that smoking was just a habit. Cigarettes were now cast as addicting and as equally addictive as many illegal drugs. The findings also had implications for treatment, pointing to the possibility of using nicotine replacement therapy to increase successful quitting of nicotine (USDHHS 1988). For smoking initiation by youth, the finding that nicotine is addicting raised concern that adolescents and young adults might become addicted through experimentation; by 1988, the pattern



of initiation had moved to the teen years for both males and females (USDHHS 1988). The 1994 Surgeon General's report on *Preventing Tobacco Use Among Young People* emphasized that tobacco use and addiction almost always begins before 18 years of age and that most adolescent smokers face the same challenges as adults in quitting smoking (USDHHS 1994).

Like the 1986 report, the 1988 report had profound implications for the tobacco industry, and the report also

received great attention from the industry and its consultants. The tobacco industry had information about the report when it was in development and was quick to criticize its findings after release. The finding that nicotine was addicting countered the argument that people became smokers by their own free choice. Efforts to discredit the report continued long after its publication, even though the industry's own documents show that it had long known that nicotine was addicting (Proctor 2011).

## Denormalization and the Tobacco Industry

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Beginning in the mid-1970s, per capita cigarette consumption began to decline more steeply than during the decade following the 1964 report (Figure 2.1). The scientific findings on tobacco smoke, summarized and transmitted to the health community and the population at large through the Surgeon Generals' reports and other channels, provided a basis for motivating effective action to control tobacco use. Underlying the decline was increasing public understanding of the dangers of cigarette smoking and increasing unacceptability of being a smoker; that is, the social norm around smoking changed from being completely acceptable and woven into day-to-day activities and interactions among people to becoming an increasingly unacceptable behavior. Many factors contributed to this change, including the evidence on the dangers of exposure to secondhand smoke and the ever-increasing reluctance of nonsmokers to inhale tobacco smoke in their workplaces, public places, and eventually their homes (USDHHS 1986).

Additionally, the tobacco control "toolbox" expanded with an increasing number of strategies: smoking bans, which both protected nonsmokers and encouraged cessation; educating youth and limiting their access to tobacco products with enforced laws; raising taxes to force the price of cigarettes upward; encouraging smoking cessation and using treatments that were shown to be effective; and using the media to counter the marketing of the tobacco industry (Kluger 1996; Proctor 2011). Advocacy at the local grassroots level played a critical role as nonsmokers demanded smoke-free environments. The need for using a battery of tobacco control measures was recognized and trials were carried out at the community level to assess the efficacy of combined approaches and their effectiveness in practice.

For example, during the 1990s, NCI conducted a large nationwide intervention study – American Stop Smoking Intervention Study, known as ASSIST. With a budget of approximately \$117 million over 7 years, ASSIST provided funding to 17 states for the development of coalitions to pursue a range of interventions and policies at the state and local levels, including (1) promoting smoke-free environments; (2) countering tobacco advertising and promotion; (3) limiting youth access to tobacco products; and (4) raising excise taxes to increase the price of tobacco products (NCI 2005). The project was unique at the time for its scale and focus on studying the effectiveness of broad strategies for policy change. The intervention led to a greater reduction in the prevalence of smoking in states participating in the ASSIST program than in non-ASSIST states, although the effect was modest, likely because of the general trend of declining per capita cigarette consumption over the years of the study (Figure 2.1) (NCI 2005).

State tobacco control programs also took a more aggressive approach during the 1990s, moving beyond a focus on the harms of exposure to secondhand smoke to directly countering cigarette advertising efforts. As cigarette advertising linked smoking to glamour, vitality, and social success, some state programs, such as those in California, Florida, and Massachusetts, turned to explicit denormalization strategies (USDHHS 2000). They aimed "to push tobacco use out of the charmed circle of normal, desirable practice to being an abnormal practice" (California Department of Health Services 1998, p. 3). In the late 1990s, the states received substantial funding from the 1998 Master Settlement Agreement (MSA) between the tobacco companies and the attorneys general of 46 states (USDHHS 2000, 2012). Initially, some of the funds

from the MSA were directed to tobacco control, but the funding declined as states used the revenues for other purposes and only a few states ever reached the CDC's recommended funding levels (Sloan et al. 2005; CDC 2012).

Additionally, after decades of failed personal injury lawsuits against the tobacco industry for smoking-related harms, the climate for tobacco industry litigation transformed during the 1990s. There was one major development with *Cipollone v. Liggett Group, Inc.*, a personal injury case filed in 1983 on behalf of a New Jersey smoker and lung cancer victim (*Cipollone v. Liggett Group* 1988). The plaintiffs gained access to some internal tobacco company documents supporting claims that the industry had conspired to withhold information about harm from the public. But, it was during the 1990s that far more complete access was gained to the industry's internal documents. Two major events made this possible. First, an employee of a law firm that represented tobacco companies released documents to the public that exposed the tobacco companies' misconduct. Second, class-action litigation and litigation on behalf of state governments allowed plaintiffs to combine their resources and expertise on a scale not before realized (Miura et al. 2006). The litigation by the State of Minnesota and Blue Cross and Blue Shield of Minnesota resulted in the release of the industry's documents and their maintenance in two repositories, one in Minnesota for the U.S. industry and the other in Guildford, England, for British American Tobacco's documents. Under the MSA, the industry is required to continue to place its documents into a depository until 2021. The Legacy Tobacco Documents Library at the University of California at San Francisco (2013) was created to house these documents.

The MSA was the result of suits by state governments against tobacco companies to recover Medicaid expenses they had paid to care for sick smokers (USDHHS 2000). From 1993–1998, almost every state filed an action against the tobacco companies. The process ended with individual settlements with the states of Florida, Minnesota, Mississippi, and Texas, and the MSA with the remaining 46 states and the District of Columbia. The MSA required tobacco companies to pay \$206 billion over the initial 25 years of the agreement. The MSA did not just provide monetary relief to the states, but also placed restrictions on the tobacco companies that included ending cigarette billboard advertising, banning the use of merchandise with cigarette brand names, and limiting sponsorships. Additionally, as a result of the Minnesota Settlement and the MSA, tens of millions of pages of internal memoranda, reports, and other tobacco company documents initially acquired through litigation were made available to the public (USDHHS 2000).

The tobacco industry was further discredited by congressional hearings and the litigation brought by the U.S. Department of Justice (DOJ) against the industry, *United States v. Philip Morris*, under the *Racketeer Influenced and Corrupt Organizations Act* (RICO 1970). FDA launched a large-scale investigation into the manipulation of nicotine levels in cigarettes and marketing to youth and, for the first time, asserted jurisdiction over cigarettes as drug delivery devices (see Chapter 14). At a 1994 hearing, seven tobacco company CEOs insisted that they believed nicotine was not addictive and not a cause of disease. Photographs of the group holding up their right hands and being sworn in at the hearing, while denying what most members of the public knew to be true about cigarettes, turned them into objects of ridicule and further diminished the public's view of the tobacco industry (Brandt 2007). In the DOJ litigation, the industry was found guilty of violating civil racketeering laws and lying to the public about the dangers of tobacco and its marketing to children. The opinion by Judge Gladys Kessler focused on the representation of cigarettes with reduced machine yields of tar and nicotine as conveying lower risks and the industry's denial of the health effects of exposure to secondhand smoke (*United States v. Philip Morris et al.* 2006).

Momentum from the states' lawsuits also turned the political tide against the tobacco industry in the mid-1990s, and their influence in Congress weakened (Sack 1997). Additionally, the characteristics of legislative debates on tobacco control measures at the state level changed from its prior focus (on the sufficiency of scientific evidence of health effects during the 1970s and early 1980s) to the impact of tobacco industry activities and marketing on children (Jacobsen and Wasserman 1997). Evidence compiled by FTC and researchers demonstrated that the RJ Reynolds' Joe Camel marketing campaign had a measurable impact on smokers below the legal age and was accompanied by an increase in smoking initiation among youth (DiFranza et al. 1991; Pierce et al. 1998). During this period, tobacco companies lost credibility in the eyes of the public. A Harris poll taken in March 1997 found that 92% of the respondents believed "tobacco companies know it causes cancer even if they do not admit it" and 80% believed that "some tobacco companies market their products deliberately to young people" (Sack 1997).

Attitudes around the engagement of scientists and physicians with the tobacco industry were also changing during the 1990s. The tobacco industry had long funded researchers through the Council for Tobacco Research and later through the Center for Indoor Air Research (Proctor 2011). Such funding became increasingly unacceptable, and universities began to implement policies that prohibited receipt of funding from the tobacco industry. It

had also recruited researchers as consultants, who were key in its doubt-creating initiatives. Engagement with the industry became increasingly unacceptable for researchers whose reputations were tarnished by their industry activities. At the same time, concerns about potential conflicts of interest among scientists increased, and disclosure of consulting activities to universities became the norm, making it more difficult for researchers to maintain secret ties to the tobacco industry. By contrast, when the 1964 report was released, there was little concern that scientists' results would be influenced by their funding source. During the 1990s, a number of tobacco control researchers and organizations began to speak out against tobacco industry funding of research at academic institutions. Some academic medical journals instituted policies refusing to accept papers for review if the research had been funded by the tobacco industry. In 1994, a number of academic medical centers, including Brigham and Women's Hospital, Massachusetts General Hospital, MD Anderson Cancer Center, Roswell Park Cancer Institute, and others, adopted policies barring their faculty and staff from accepting tobacco industry support. The bio-

medical research community was divided over the issue at the time, as some academic medical leaders objected that restrictions on funding from any particular industry would amount to a restriction on academic freedom. However, tobacco control advocates countered that the tobacco industry's well-documented record of manipulating scientific information and the extent of the harms from cigarette smoking distinguished them from other industries (Proctor 2011).

Under Commissioner David A. Kessler, who held the office from 1990–1997, FDA had attempted to regulate tobacco products (USDHHS 2000). This effort was ended by the Supreme Court, which found that Congress had not intended that FDA should regulate tobacco when it passed the *Food, Drug, and Cosmetic Act* (Bayer et al. 2013; Orentlicher 2013). With the passage of the *Family Smoking Prevention and Tobacco Control Act* (*Tobacco Control Act*) in 2009, FDA received authority to regulate tobacco products. FDA's Center for Tobacco Products is now proceeding with implementation of the provisions of the Act (see Chapter 14).

## Summary

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Over the “cigarette century,” cigarette smoking prevalence has risen and fallen and moved from being widely accepted to socially unacceptable. In 1964, almost one-half of U.S. adults were cigarette smokers and smoking was ubiquitous in many public places, including restaurants, theaters, and airplane cabins. Today, the overall prevalence of U.S. adult smoking is around 20%, less than one-half of what it was in 1964 (see Chapter 13); as of April 2013, 81% of the U.S. population lives in municipalities covered by a smoke-free workplace law at the state or local level that includes at least nonhospitality workplaces (American Nonsmokers' Rights Foundation 2013). Twenty-four states and the District of Columbia have 100% smoke-free workplace laws that also cover bars and restaurants. In July 2011, a Gallup poll reported that for the first time, a majority of Americans (59%) supported a ban on smoking in all public places (Newport 2011). Opinions of the tobacco industry have fallen so low that it is now consistently ranked among the most distrusted of industries (Harris Poll 2012). The industry has been found guilty in the courts as well. Most notably, in 2006, U.S. District Judge Kessler ruled in the decade-long DOJ's lawsuit against the tobacco industry, finding “the industry had marketed and sold their lethal products with zeal,

with deception, with a single-minded focus on their financial success, and without regard for the human tragedy or social costs that success exacted” (*United States v. Phillip Morris* 2006, p. 28). The tobacco industry is the only legal industry to have been pursued and convicted under federal racketeering statutes.

The epidemic of smoking-caused disease in the twentieth century ranks among the greatest public health catastrophes of the century, while the decline of smoking consequent to tobacco control is surely one of public health's greatest successes. Many premature deaths have been avoided because of tobacco control programs, but many more could have been avoided if smoking prevalence had dropped more rapidly when the early warnings of lung cancer risk were widely reported in 1950. The 1964 Surgeon General's report gave momentum to tobacco control; the authority of the Surgeon General, and the approach of the Advisory Committee to developing the report, gave unimpeachable credibility to the conclusion that smoking caused lung cancer (in men). That same authority has empowered the conclusions of subsequent reports that have covered involuntary smoking, addiction to nicotine, tobacco control interventions, smoking by adolescents and young adults, and other topics.

Tobacco control programs proved more challenging than simply disseminating knowledge to the population of the dangers of smoking. Brandt notes that "Smoking is a complex behavior which has reflected deep social, cultural, and economic forces, as well as a powerful biological process of addiction. Simply identifying individual behavior as the primary vehicle of risk negates the fact that behavior itself is, at times, beyond the scope of individual agency" (Brandt 1990, p. 172). This complexity, the addicting nature of nicotine, and the dynamic efforts of the industry to maintain its market, challenged initial efforts to curb tobacco use. Over time, the need for broad interventions with multiple components was recognized, and cigarette consumption began to decline at a faster pace (Figure 2.1). Several factors were particularly crucial in altering social norms around cigarette smoking in the United States, making it increasingly less acceptable: (1) the emergence of a nonsmokers' rights movement and evidence linking exposure to secondhand smoke to disease; (2) an understanding of regular cigarette smoking as an addictive behavior and one that begins in adolescence; and (3) a focus on the tobacco industry itself as a key influence on smoking behavior and the importance of countering its actions. Other factors played a role in shaping attitudes and policies around cigarette smoking, including changes in political administrations, the development of a grassroots advocacy movement, the changing climate for litigation, and developments in the organization of public health research.

The production of the 1964 Surgeon General's report itself was a significant public health action, even if direct and immediate policy action seemed slow to follow. Additionally, the 1964 report was a pioneering step toward anticipating a much larger role for government, in collaboration with scientists, to use science to inform regulatory and other policies. This approach is embodied in the 2009 *Tobacco Control Act*. Although early twentieth century antitobacco reformers appealed to moral and social

concerns to support their cause, the 1964 report reinforced the central role of science as the primary authority to inform public health policy. Subsequent reports have maintained that position.

Because of the complexity of the factors involved, it is difficult to measure the degree to which particular interventions, following the 1964 report, influenced patterns of tobacco use. However, it is clear that tobacco control policies and actions need to draw on the full suite of interventions of proven efficacy. Grassroots activities and coalitions have played a critical role, as they supported smoking bans and had substantial impact in changing the social norm around smoking.

The past half-century of public health experience with cigarette smoking, since the 1964 report, holds many important lessons for the future and for the actions that will follow from this report. Overall, this ongoing story illustrates the complexity of the factors involved and the need to consider cigarette smoking, not simply as an individual decision about behavior, but as a large-scale social and cultural phenomenon. Despite the conclusive evidence of the harms of cigarette smoking presented in the 1964 report, as evaluated by an objective group of experts, the process of changing public beliefs, attitudes, and behaviors took decades, and the implementation of effective policies involved a lengthy process of intervention, evaluation, and surveillance. The tobacco industry's extensive campaign to counteract these forces through marketing, public relations, political influence, and creation of doubt about the scientific evidence on tobacco is now well documented through the industry's internal documents. The industry used its influence to thwart public health action at all levels and fraudulently misled the public on many issues, including whether lower-yield cigarettes conveyed less risk to health and whether exposure to secondhand smoke harmed nonsmokers. Undoubtedly, these actions slowed progress in tobacco control.

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